REMARKS

Reconsideration and allowance of the subject application are respectfully requested. Upon entry of this Amendment, claims 1-10 are pending in the application. In response to the Office Action (Paper No. 5), Applicant respectfully submits that the pending claims define patentable subject matter.

The title of the invention is objected to because the Examiner maintains that the title is not descriptive of the invention to which the claims are directed. By this Amendment, Applicant has amended the title to improve clarity. Accordingly, the Examiner is requested to remove the objection to the title.

The drawings are objected to because the Examiner maintains that the drawings do not show every feature of the invention specified in the claims. In particular, the Examiner maintains that the "speed detector" recited in claim 4, the "temperature sensing device" recited in claim 5, and the "current detecting device" recited in claim 6 are not shown in the drawings. By this Amendment, Applicant has amended claims 5 and 6 to delete these features. Further, along with this Amendment, Applicant is submitting a Proposed Drawing Correction showing the claim features of claim 4 noted by the Examiner. Accordingly, the Examiner is requested to remove the objection to the drawings.

Claims 3 and 10 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite because the Examiner maintains that claims 3 and 10 include elements which are not clearly recited. By this Amendment, Applicant has amended claims 3 and 10 to improve clarity. Accordingly, the Examiner is requested to remove the § 112, second paragraph, rejection of record.

Claims 1, 3, 4 and 7 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaneyuki (USP 5,418,401) in view of Suzuki et al. (USP 5,552,681, hereafter "Suzuki"). Claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaneyuki in view of Suzuki and Taniguchi et al. (USP 5,719,484, hereafter "Taniguchi"). Claims 5 and 6 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaneyuki in view of Suzuki and Kato et al. (USP 5,280,231, hereafter "Kato"). Claims 8-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Kaneyuki in view of Inaniwa et al. (USP 5,731,681, hereafter "Inaniwa"). Applicant respectfully submits that the claimed invention would not have been rendered obvious in view of the combined references.

The present invention is directed to a vehicle electrical power supply system for supplying power to both a high power load, such as a blower motor or windshield heater, and a conventional load, such as a battery, using a conventional alternator. In a first embodiment of the present invention shown in Figure 1, the power supply system comprises an alternator 1 including an armature assembly 2 and a field coil 3, a regulator 4, a battery 5 and a high power load 7. A power relay 8 switches a power supplied from the alternator 1 to the battery 5 or the high power load 7. A control unit 9 detects an on/off state of a switch 10 for supplying power to the high power load 7, and switches the power relay 8 to the battery 5 for charging or the high power load 7. The control unit 9 also controls the regulator 4, whereby an output voltage of the alternator 1 is switched to a low charging voltage for the battery 5 or a high voltage for the high power load 7. That is, the regulator 4 operates a voltage controller for controlling a field current of the field coil 3 in order to change the output voltage of the alternator 1. A stepping-up DC/DC

converter 6 is provided for stepping up a voltage of the battery 5 and supplying the stepped-up voltage to the field coil 3. In particular, the stepping-up DC/DC converter 6 steps up the battery voltage by a factor of 1.2 to 2.0 in order to increase the field voltage of the field coil 3 and thereby increase a maximum output power of the alternator 1.

Amended independent claims 1 and 8 recite, in part, an alternator having an armature winding and a field coil for supplying a power to both a high power load and a battery, a stepping-up DC/DC converter for stepping up a voltage of said battery and applying a stepped-up voltage to said field coil, a voltage control means for controlling an output voltage of said alternator by controlling a current of said field coil. As the Examiner correctly notes, Kaneyuki does not teach or suggest a stepping-up DC/DC converter for stepping up a voltage of the battery and applying a stepped-up voltage to the field coil (of the alternator). Rather, Kaneyuki discloses that the battery is directly connected to the field coil. However, the Examiner asserts that Suzuki (claim 1) and Inaniwa (claim 8) disclose a step-up DC/DC converter.

With regards to independent claim 1, Applicant respectfully submits that it is quite clear that Suzuki does not teach or suggest a stepping-up DC/DC converter for stepping up a voltage of the battery and applying a stepped-up voltage to the field coil (of the alternator). Rather, Suzuki (Figure 3) discloses that utilizing a step-up/step-down converter 21 which is connected to a storage battery 22 and generates a high voltage which is provided to an electrostatic capacitive circuit 20. The electric charge stored in the electrostatic capacitive circuit 20 is provided to an inverter circuit 4 where it is converted to a polyphase alternating current and provided to a

squirrel-cage polyphase induction machine 2 to make the squirrel-cage polyphase induction machine 2 operate as an electric motor.

With regards to independent claim 8, Applicant respectfully submits that it is quite clear that Inaniwa does not teach or suggest a stepping-up DC/DC converter for stepping up a voltage of the battery and applying a stepped-up voltage to the field coil (of the alternator). Rather, Inaniwa (Figure 19) discloses a power control system including a control unit 100 including a step-down converter 196 and a step-up converter 197 which are not connected to the battery or the field coil of the alternator.

Similarly, Applicant respectfully submits that neither Taniguchi nor Kato teach or suggest a stepping-up DC/DC converter for stepping up a voltage of the battery and applying a stepped-up voltage to the field coil (of the alternator), as recited in claim 1.

Accordingly, independent claims 1 and 8, as well as dependent claims 2-7, 9 and 10, should be allowable because the applied references do not teach or suggest all of the claims.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Applicant hereby petitions for any extension of time which may be required to maintain the pendency of this case, and any required fee, except for the Issue Fee, for such extension is to be charged to Deposit Account No. 19-4880.

Respectfully submitted,

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APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE TITLE:

The title is changed as follows:

VEHICLE ELECTRICAL POWER SUPPLY SYSTEM [FOR A VEHICLE] FOR SUPPLYING POWER TO A HIGH POWER LOAD

IN THE CLAIMS:

The claims are amended as follows:

1. (Amended) An electrical power supply system for an automotive vehicle comprising:

an alternator having an armature winding and a field coil for supplying a power to both a high power load and a battery,

a stepping-up DC/DC converter [to step up] for stepping up a voltage of said battery [for] and applying a stepped-up voltage to said field coil,

a voltage control means for controlling an output voltage of said alternator by controlling a current of said field coil, and

a control means for increasing power of said alternator by changing said output voltage of said alternator in response to a rotating speed of said alternator when said alternator supplies power to said high power load ,and for controlling said output voltage of said alternator to a battery charging voltage by regulating said voltage control means when said alternator supplies power to said battery.

3. (Amended) The electrical power supply system for the automotive vehicle according to claim 1, wherein said output voltage of said alternator [changing] which changes in response to said rotating speed is set to be higher than said voltage of said battery.

5. (Amended) The electrical power supply system for the automotive vehicle according to claim 1, wherein said voltage control means controls said field current of said alternator [is controlled by] based on a detected temperature of said field coil [by a temperature sensing device in said voltage control means].

6. (Amended) The electrical power supply system for the automotive vehicle according to claim 1, wherein said voltage control means controls said field current of said alternator [is controlled by] based on an inferred temperature from said field current of said alternator [detected by a current detecting device in said voltage control means].

8. (Amended) An electrical power supply system for an automotive vehicle comprising:

an alternator having an armature winding and a field coil for supplying a power to both a high power load and a battery,

an alternator having an armature winding and a field coil for supplying a power to both a high power load and a battery.

a stepping-up DC/DC converter [to step up] for stepping up a voltage of said battery [for] and applying a stepped-up voltage to said field coil

a voltage control means for controlling an output voltage of said alternator by controlling a current of said field coil, and for increasing an output of said alternator by changing said output voltage in response to a rotating speed of said alternator in a predetermined rotating speed zone, and

a stepping-down DC/DC converter to step down said output voltage of said alternator to a charging voltage for said battery, and to supply power with a regulated voltage to both said battery and said high power load.

10. (Amended) The electrical power supply system for the automotive vehicle according to claim 8, wherein an output voltage of said stepping-down DC/DC converter has negative gradient temperature characteristics for suppressing a temperature rise of said alternator.